

**Alternatives Analysis
Byhalia Connection Pipeline
TDEC ARAP NRS20.089**

Byhalia Pipeline LLC (Byhalia) has taken into consideration multiple alternatives in deciding how to best route the proposed Byhalia Connection Pipeline (Project). This Alternatives Analysis has been prepared in support of Byhalia's Section 404 Permit Application. Multiple iterations of the pipeline route were considered. The preferred project route was chosen not only to minimize impacts to the environment, but also cultural sites, public lands, levees, landowners, and communities during construction and once the line is in service. The proposed route parallels existing pipeline and utility corridors where practical to reduce its overall footprint, with additional avoidance and minimization measures employed to reduce impacts to natural resources where possible. A discussion is presented below of the alternatives considered for the project route.

Purpose and Need

The proposed project is a 26-inch common carrier crude oil pipeline from the Valero Refinery in Shelby County, Tennessee to the Valero Collierville Terminal Facility in Marshall County, Mississippi. It will connect two major existing crude oil pipeline systems: linking the Diamond Pipeline, originating in Cushing, Oklahoma to the Capline System which extends from Central Illinois to the Gulf Coast. A pipeline was selected for this project because it would connect two existing pipeline systems and because transporting crude oil by pipeline is safer than moving it by truck, and more efficient and cost-effective than rail. Connecting these two pipelines greatly increases shipper flexibility and the efficiency of crude oil transportation in the region and throughout the U.S., while helping secure American energy independence.

Route Criteria

Byhalia designated the following criteria in order to achieve the stated purpose and need while identifying a route to be used for the Project. The following criteria were used to evaluate the alternatives:

- Residential Neighborhoods
- Protected Species and Habitat
- Wetlands and Waterways
- Historic Sites and Cultural Resources
- Federal, State, and Local Government Facilities, Structures, or Lands
- Private Property Access
- Pipeline Constructability

Route Alternatives

No Action Alternative

Under this alternative, Byhalia would not construct or operate the proposed pipeline. This alternative would not provide an interconnection to the two existing major crude oil pipeline systems, connecting major terminals in Cushing, Oklahoma with the Capline Pipeline running between Central Illinois and the Gulf Coast. The no action alternative does not meet the project's overall purpose of providing a connection between these two pipelines and was not further considered.

Alternative 1 – East Route (Red)

Byhalia considered an approximately 33-mile route east from the Valero Refinery and through the City of Memphis. However, this route has significant environmental impacts associated with multiple crossings of the Noncannah River and its associated wetland and floodplains. This route would closely parallel the Noncannah River for approximately 6 miles with four river crossings. Furthermore, this route is adjacent to the Noncannah Levee System (Civil Works Project) for approximately 1 mile with open cuts and drills near the levee which could affect the structural integrity of the flood control structure. Additionally, along the portion of the route paralleling the levee, the presence of existing utilities and other infrastructure, would greatly constrain the space necessary to safely construct the project. This route would also cross through Memphis International Airport property, industrial areas, and residential areas raising safety and constructability concerns. This alternative is impracticable based on environmental, safety, and constructability concerns.

Alternative 2 – Corridor Route (Blue)

Byhalia considered an approximately 35-mile route travelling south from of the Valero Refinery that would travel through the city of Memphis before meeting up with the Alternative 1 – East Route. However, safely constructing the pipeline in this route may not be possible due to limited space along railroad and overhead transmission line corridors. This route would cross the Memphis Harbor (McKellar Lake) and would encroach on T.O. Fuller State Park and cross under a significant aquatic resource in Robco Lake. Additionally, acquiring the right-of-way for portions of this route crossing Tennessee Valley Authority (TVA) lands may be difficult. The Alternative 2 corridor route would cross through fewer industrial areas than Alternative 1, but still pass through several residential neighborhoods raising safety and constructability concerns. Alternative 2 is impracticable due to constructability concerns and its routing through a state park and residential neighborhoods.

Alternative 3 – Western Route (Yellow)

Byhalia considered an approximately 50-mile route travelling west from of the Valero Refinery that would largely avoid City of Memphis residential areas before meeting up with Alternative 5 – Proposed/Preferred Route. This route would cross the Ensley Levee System (Civil Works Project) twice, which raises concerns over the structural integrity of the flood control structures. This route also crosses North Horn Lake and its associated wetlands. Additionally, this route would cross adjacent to the TVA coal ash remediation site

Trenching and drilling associated with construction of the Project could potentially exacerbate pre-existing groundwater contamination associated with this site and result in contaminant migration. This route would cross T.O. Fuller State Park and is near the Chucalissa Archaeological Park, which may impact cultural resources. This alternative is impracticable due to these combined factors.

Alternative 4 – South Route (Purple)

Under alternative 4, Byhalia considered an approximately 43-mile route travelling south from the Valero Refinery to Horn Lake, Mississippi before turning east. This route would cross the Memphis Harbor (McKellar Lake), T.O. Fuller State Park and a Desoto County, Mississippi property containing a public softball field. Additionally, this route would cross a previously recorded cemetery. Although the cemetery has likely been moved due to previous construction and development activities, significant cultural resource impacts could occur if unmoved or unmarked graves were encountered during construction. This route also crosses several properties where right-of-way access is a concern. This alternative is impracticable primarily due to landowner access and cultural resource concerns.

Alternative 5 – Preferred Alternative (Green)

The proposed route selected as the preferred alternative by Byhalia is an approximately 49-mile route that travels south from of the Valero Refinery to Horn Lake, Mississippi before turning east. This route avoids more densely populated residential neighborhoods by primarily travelling through undeveloped rural areas. This route avoids the private parcels with landowner access issues discussed in Alternative 4 and also avoids T.O. Fuller State Park, federal properties, Robco Lake, levee systems and previously recorded cemeteries. This route crosses wetlands associated with the Coldwater River and Clearwater Creek but avoids crossing the Coldwater River. Impacts to waters are temporary during construction and the avoidance and minimization measures, as described below, will be incorporated to reduce the temporary impacts. Further, due to the linear nature of the Project, there is no alternative route that can avoid impacts to the aquatic ecosystem. Alternative routes will have new and significant adverse consequences (e.g., cultural, hydrological, environmental).

Social and Economic Justification (Environmental Justice)

The project would have significant economic benefits to the local economies. An Economic Impact Study performed by the University of Mississippi estimated pipeline construction would result in \$14 million of direct economic benefits and generate tens of millions in indirect benefits and property tax revenue in DeSoto, Marshall and Shelby counties. Construction of the project will have a positive ripple effect specific to the regional economy in Tennessee, generating \$2.4 million of economic impact in Shelby County alone. Likewise, property taxes generated by operation of the Byhalia Connection Pipeline will strengthen the local tax base each year, generating approximately \$500 thousand each year.

Comparison of Environmental Impacts

A comparison of environmental impacts and other criteria considered to evaluate the project alternatives is detailed in the table below. Alternative 5, the preferred alternative, was routed to avoid or minimize all areas of concern. All alternatives analyzed include wetland and waterway crossings. However, potential impacts to these waters would be temporary and minimized with the avoidance and mitigation measures discussed below.

Concerns	Alternative 1 (East Route)	Alternative 2 (Corridor Route)	Alternative 3 (Western Route)	Alternative 4 (Southern Route)	Alternative 5 (Preferred Route)
Residential Neighborhoods	Yes	Yes	Minimized	Minimized	Minimized
Protected Species and Habitat	Unknown	Unknown	Unknown	Unknown	No
Wetlands and Waterways	Yes (includes 4 crossings of the Noncannah River)	Yes (includes Robco Lake)	Yes (includes North Horn Lake)	Yes (includes McKellar Lake)	Yes
Historic/Cultural Sites	Unknown	Unknown	Yes (Chucalissa Archaeological Park)	Yes (Cemetery)	No
Federal, State, and Local Lands and Facilities	Yes (Memphis Airport)	Yes (T.O. Fuller State Park)	Yes (T.O. Fuller State Park, TVA)	Yes (Marina, T.O. Fuller State Park, Softball Field)	No
Private Property Access Issues	No	No	No	Yes	No
Pipeline Constructability Issues	Yes (Levee crossings, construction space constraints, and TVA contaminated coal ash site)	Yes (Construction space constraints)	Yes (Levee Crossings)	No	No

Avoidance and Minimization

The proposed project has taken measures to further avoid and minimize impacts to wetlands, streams, and ponds to the maximum extent practicable and feasible in the construction plans of the proposed pipeline route within the Memphis District (and entire project corridor). Where the project cannot avoid impacts, these impacts will be temporary, occurring only during construction. The project avoids and minimizes wetland and stream impacts with the use of horizontal directional drills (HDD) as well as

centerline reroutes and “neck-downs” of workspace within palustrine forested (PFO) wetlands, where practicable. HDD and conventional boring will also be utilized at large stream crossings to minimize impacts to stream bed and bank, as well as water quality. The use of HDD in select wetland locations results in the avoidance of approximately 0.25 acres of PFO impacts. The temporary workspace at wetland crossings has been reduced to 25 feet to reduce impacts to wetland functions (everywhere feasible). Additionally, the pullback area for the HDD under the rail yard north of Cypress Creek was originally planned towards the south into the Cypress Creek forested wetlands and bottomland hardwood forest, which would have resulted in approximately 1.0 acre of impacts. Flipping this pullback area to the north combined with other avoidance and minimization efforts has resulted in the avoidance of an additional 1.53 acres of PFO impacts, and 0.20 acres of palustrine emergent (PEM) wetland impacts within Tennessee and the Memphis District (total of 1.73 acres of wetlands avoided).

Overall, the selected project route would employ avoidance and minimization measures that avoids impacts to 14.53 acres of PFO, 2.99 acres of PEM, and 1.48 acres of PSS wetlands. The use of HDD would also eliminate impacts to 29 perennial streams and 2,313.37 linear feet of intermittent stream impacts.

Least Environmentally Damaging Practicable Alternative (LEDPA)

Alternative 5 is the LEDPA based on the following:

- The No Action Alternative does not meet the Project’s overall purpose of providing a common carrier crude oil pipeline interconnection between the Diamond and Capline pipeline systems from the Valero Refinery in Shelby County, Tennessee to the Valero Collierville Facility in Marshall County, Mississippi.
- Alternative 5 does not have the potential to impact significant cultural resources. Other alternative routes may impact cultural resources associated with a cemetery or the Chucalissa Archaeological Park.
- Alternative 5 results in no adverse impact to threatened and endangered species.
- Alternative 5 avoids impacts to flood control structures. Alternatives 1 and 3 includes crossings of levee systems that may impact the integrity of these structures.
- Alternative 5 avoids the TVA coal ash remediation site. Alternative 3 would cross this site potentially exacerbating existing groundwater contamination.
- All of the Alternatives include crossings of wetlands and waterways. However, the impacts to these waterways will be temporary and minimized through the use of avoidance and mitigation measures. Alternative 5 avoids multiple crossings of the Nancannah River and a crossing of Robco Lake.
- Alternative 5 avoids Tennessee’s T.O. Fuller State Park. The other alternatives cross this public land or other public agency lands or facilities.